

Opening Questions

As a team, think of a chemical that you would like to be exposed to because it makes you healthier. Think of a chemical that you would try to avoid because it harms you in some way. Record these two chemicals in your science notebook.

Use complete sentences to answer the following questions about each of the chemicals:

- **Where do you find the chemical?**
- **How does the chemical enter your body?**
- **How does it make you healthier or harm you?**
- **How much chemical do you need to be exposed to for it to help you or harm you?**

Making Solutions for Toxicity Testing

Materials for Each Team

6 50-mL beakers, clean and empty	eyedropper
1 50-mL graduated cylinder	masking tape
1 10-mL graduated cylinder	permanent marker
1 100-mL beaker with 50 mL of chemical	safety glasses
100 mL of water in a beaker	latex gloves
1 tray	

Procedure

1. Put on the latex gloves and safety glasses.
2. Use the masking tape and marker to label each of the six empty 50-mL beakers with information from the following table.

Beaker #	Amount of Water	Amount of Chemical	Total Volume of Liquid	% Concentration of Chemical
1	20.00 mL	0.00 mL	20 mL	0%
2	18.75 mL	1.25 mL	20 mL	6.25%
3	17.50 mL	2.50 mL	20 mL	12.5%
4	15.00 mL	5.00 mL	20 mL	25%
5	10.00 mL	10.00 mL	20 mL	50%
6	0.00 mL	20.00 mL	20 mL	100%

3. Use the 50-mL and the 10-mL graduated cylinders to measure the correct amount of water. Pour the water into each of the labeled beakers according to the above table. Use the eyedropper for small corrections.
4. Use the 50-mL and the 10-mL graduated cylinders to measure the correct amount of chemical. Pour the chemical into each of the labeled beakers of water according to the above table. Use the eyedropper for small corrections.
5. When you have finished, check that all the beakers contain 20 mL of chemical solution. If a beaker contains more or less than 20 mL, consult the above table and repeat the procedure for that beaker. Place the beakers in order on the tray, with 0 percent concentration on the left and 100 percent concentration on the right.
6. Return any unused chemical to your teacher. Wash all other containers and put them away.

Toxicity Testing on Seeds

Materials for Each Team

6 resealable plastic sandwich bags

12 paper napkins

6 beakers of chemical solution, ranging from 0% to 100% concentration

1 bag of seeds (approximately 60 seeds in a bag)

1 permanent marker

latex gloves

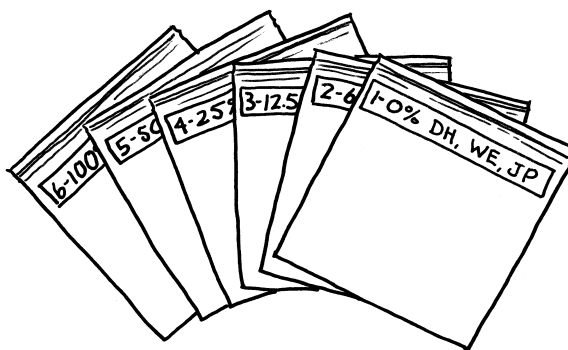
safety glasses

1 tray

Procedure

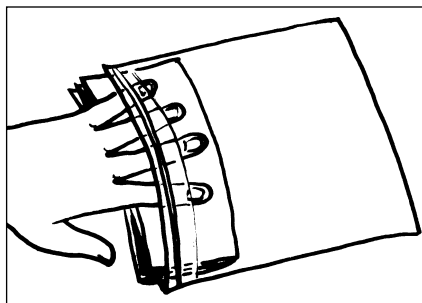
1. Label all six bags with your team members' initials and a number and a percent concentration of chemical, like this:

#1	0% (control)
#2	6.25%
#3	12.5%
#4	25%
#5	50%
#6	100%

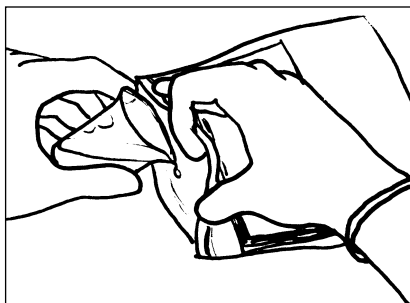


Step 1

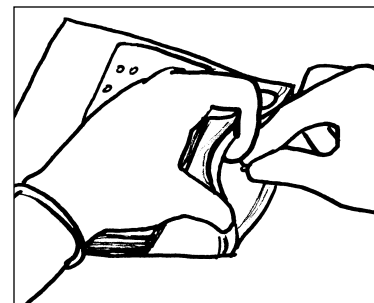
2. Put two napkins together and fold them in half so that they fit into the plastic bag. Fill each bag with two folded paper napkins.



Step 2



Step 3



Step 4

3. Put on the safety glasses and latex gloves. Carefully pour the chemical solutions into the bags, making sure to match the numbers and concentration percentages of the bag and the chemical. Each bag now will contain 20 mL of chemical solution that is absorbed by the paper napkins.

4. Count out 10 seeds. Carefully place the seeds on the moist paper napkins in the control bag (#1), making sure to space them evenly (do not clump them in one spot). Seal the plastic bag, pushing out the air as you go.
5. Repeat Step 4 for the remaining bags.
6. Observe the seeds and fill in the following data table with information you know at this time.

Bag #	Dose (% Concentration)	Response					
		Day 1		Day 2		Day 3	
		# of seeds germinated	# of seeds not germinated	# of seeds germinated	# of seeds not germinated	# of seeds germinated	# of seeds not germinated
1 (control)	0%						
2	6.25%						
3	12.5%						
4	25%						
5	50%						
6	100%						

7. Place the seed bags in a stack, lying flat with the seeds up, on the tray. Put the tray of seeds in the spot designated by your teacher. Put this worksheet in your science notebook.

Questions

1. What is your chemical? Describe what you know about the chemical. (Do you consider it harmful, beneficial, or neither? What is it used for? How would a human be exposed to this chemical?)
2. In which bag is the dose of chemical the highest? In which bag is the concentration of chemical in the solution the highest? Describe how you know.
3. Do you think you will see a difference in the effect on seeds of a small dose of chemical compared with the effect of a larger dose? Predict what you think will happen to the seeds in each bag.